

## **WRITING INSTRUCTIONS FOR SIMULATIONS**

- \* *Identify events & their probabilities*
  
- \* *State random generator & assign numbers to events*
  
- \* *One trial =*
  
- \* *Response Variable =*
  
- \* *Total # of trials =*

### **WARM UP**

**1) A basketball player makes 47% of her shots from the field during the season. Assume she takes only 5 shots per game.**

a. We want to simulate 10 games. Write instructions for this simulation.

\* Events: Make = 47%      Miss = 53%

\* Use TRD.      Make = 00 -- 46      Miss = 47 --- 99

\* One trial = 5 shots

\* Response Variable = # shots made per game

\* 10 total trials

39634 62349 74088 65564 16379 19713 39153 69459 17986  
 24537 14595 35050 40469 27478 44526 67331 93365 54526  
 22356 93208 30734 71571 83722 79712 25775 65178 07763  
 82928 31131 30196 64628 89126 91254 24090 25752 03091  
 39411 73146 06089 15630 42831 95113 43511 42082 15140  
 34733 68076 18292 69486 80468 80583 70361 41047 26792  
 78466 03395 17635 09697 82447 31405 61220 18721 67387  
 66575 88378 84299 12193 03785 49314 39761 99132 28775

shots made	frequency
0	
1	
2	
3	
4	
5	

average:  
 $2.5 \text{ shots} = \bar{x}$

2) A different basketball player makes 5 out of every 8 shots she takes. Assume she takes 6 shots per game.

a. We want to simulate 10 games. Write instructions for this simulation.

① Events: Make =  $\frac{5}{8}$  Miss =  $\frac{3}{8}$

② TRD      Make = 0-4      1-5  
              Miss = 5-7      6-8  
                                ignore 8,9      ignore 0,9

③ One trial = 6 shots

④ Response Variable = # shots made

⑤ 10 trials total

05036 22530 01705 00210 34361 52220 33060 04332 03060  
 61672 65350 70460 07140 00500 72176 10103 55160 70054  
 72002 20582 72249 04037 36192 40221 14918 53437 60571  
 40995 55006 10694 41692 40581 93050 48734 34652 41577  
 04631 49184 39295 81776 61885 50796 96822 82002 07973  
 52925 75467 86013 98072 91942 48917 48129 48624 48248  
 91465 54898 61220 18721 67387 66575 88378 84299 12193

shots made	frequency
0	
1	
2	
3	
4	
5	
6	

a. What is the average number of shots made?

$$\bar{x} = 3.8 \text{ shots}$$

b. What is the probability that she makes less than 3 shots?

$$P(X < 3) = \frac{1}{10} = 10\%$$

$$P(X \geq 4) = \frac{6}{10} = 60\%$$

3) A different basketball player makes 68% of her shots. We want to see how many shots she has to take (on average) until she makes one.

a. Write instructions for this simulation

Events: Make = 68%      Miss = 32%

TRD      Make = 00 -- 67      Miss = 68 -- 99

One trial = until she makes a shot

Response Variable = # shots taken

Conduct 10 trials



80583 70361 41047 26792 78466 03395 17635 09697 82447  
 31405 00209 90404 99457 72570 42194 49043 24330 14939  
 09865 45906 30734 71571 83722 79712 25775 65178 07763  
 82928 31131 30196 02740 03750 07304 96621 10472 03745  
 96822 82002 07973 52925 75467 86013 98072 91942 48917  
 48129 48624 48248

a. What is the average number of shots taken?

$$\bar{X} = 1.4 \text{ shots}$$

b. What is the chance she will take more than 4 shots?

$$P(X > 4) = 0\%$$

c. What is the chance she will take 2 shots or less?

$$P(X \leq 2) = 9/10 = 90\%$$

shots taken	frequency
1	
2	
3	
4	
5	
6	
7+	